

AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0009] with the following amended paragraph:

[0009] ~~In accordance with a first aspect of the invention, a combine is provided that includes a chassis on which an engine and a drive system are mounted. An electronic control system with at least one sensor monitors a physical parameter of the drive system, applies that measured parameter value to a mathematical model of the drive system, which provides another physical parameter of the drive system.~~ In accordance with a first aspect of the invention, a process for determining whether a vehicle gearbox is engaged in at least a first gear ratio or a second gear ratio is provided, the process comprising calculating which of the first and second gear ratios the gearbox is engaged; repeating the steps of calculating a plurality of times; summing the results of said calculations; and selecting between the first and second gear ratios based at least upon the results of the step of summing.

Please replace paragraph [0010] with the following amended paragraph:

[0010] ~~In accordance with a second aspect of the invention, a system estimator for a work vehicle is provided, the work vehicle having a dynamic system that is capable of being modeled in terms of at least one measurable physical parameter and a second physical parameter said second parameter being indicative of an operating condition of the dynamic system, the system estimator comprising an electronic controller including a digital microprocessor and an electronic digital memory, the memory including a sequence of preprogrammed instructions including a model of the dynamic system expressed at least in terms of the at least one measurable parameter; and at least one sensor coupled to the dynamic system and the electronic controller to generate a first signal indicative of the at least one measurable parameter and to provide the first signal to the electronic controller, wherein the electronic controller is configured to receive the first signal, apply it to the model of the dynamic system and estimate a value of the second parameter.~~ The step of calculating may include the step of determining a speed ratio.

AMENDMENT

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The speed ratio may be a ratio of an input speed to said gearbox and an output speed from said gearbox. The step of summing may include the steps of summing occurrences of first gear ratio determinations and summing occurrences of second gear ratio determinations. The step of selecting between the first and second gear ratios may include determining whether the sum of first gear ratio determinations is greater than the sum of second gear ratio determinations. The step of selecting between the first and second gear ratios may include the step of determining whether the sum of first gear ratio determinations and the sum of second gear ratio determinations exceed a minimum value. The step of calculating may include the step of determining a ratio of a motor speed signal and a rotor speed signal, and further wherein the step of selecting between includes the step of rejecting both the first and second gear ratios. The process may further include the steps of waiting an interval of time after the step of rejecting, and calculating which of the first and second gear ratios the gearbox is engaged in after the step of waiting.

Please add the following **new** paragraphs after paragraph [0010]:

[0010.1] In accordance with a second aspect of the invention, an apparatus for determining whether a vehicle gearbox is engaged in at least a first gear ratio or a second gear ratio is provided, the apparatus including means for calculating which of the first and second gear ratios the gearbox is engaged; means for repeating the steps of calculating a plurality of times; means for summing the results of said calculations; and means for selecting between the first and second gear ratios based at least upon the results of the step of summing.

[0010.2] The means for calculating may include a means for determining a speed ratio. The speed ratio may be a ratio of an input speed to said gearbox and an output speed from said gearbox. The means for summing may include means for summing occurrences of first gear ratio determinations and means for summing occurrences of second gear ratio determinations. The means for selecting between the first and second gear ratios may include means for determining whether the sum of first gear ratio determinations is greater than the sum of second gear ratio determinations. The means for selecting between the first and second gear ratios may include means for determining whether the sum of first gear ratio determinations and the sum of

second gear ratio determinations exceed a minimum value. The means for calculating may include means for determining a ratio of a motor speed signal and a rotor speed signal, and further wherein means for selecting between includes means for rejecting both the first and second gear ratios. The apparatus may further include means for waiting an interval of time after the step of rejecting; and means for calculating which of the first and second gear ratios the gearbox is engaged in, after the step of waiting.

[0010.3] In accordance with a third aspect of the invention an electronic control system for determining whether a vehicle gearbox is engaged in at least a first gear ratio or a second gear ratio is provided, including a first speed sensor; a second speed sensor; and at least one microcontroller configured to calculate at least twice which of the first and second gear ratios the gearbox is engaged in, sum the results of said calculations, and select between the first and second gear ratios based at least upon the summed results.

[0010.4] The at least one microcontroller may be configured to determine a speed ratio. The speed ratio may be a ratio of a shaft input speed to said gearbox and a shaft output speed from said gearbox. The at least one microcontroller may be configured to sum occurrences of first gear ratio determinations and sum occurrences of second gear ratio determinations. The at least one microcontroller may be configured to determine whether the sum of first gear ratio determinations is greater than the sum of second gear ratio determinations. The at least one microcontroller may be configured to determine whether the sum of first gear ratio determinations and the sum of second gear ratio determinations exceed a minimum value. The at least one microcontroller may be configured to determine a ratio of a motor speed signal and a rotor speed signal, and to reject both the first and second gear ratios. The at least one microcontroller may be configured to wait an interval of time after the step of rejecting; and calculate in which of the first and second gear ratios the gearbox is engaged after the step of waiting. The gearbox may be engageable in at least three gear ratios. The speed ratio may be a ratio of an engine speed and rotor speed.